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With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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Middle Power LED Series
2835

LM282B
6V General



Designed for better lm/\$ (Lamps)

Features & Benefits

- 0.9W Class mid power LED
- Standard form factor for design flexibility (2.8 × 3.5 × 0.65mm)



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1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-40 ~ +80	°C	-
Storage Temperature	T_{stg}	-40 ~ +80	°C	-
LED Junction Temperature	T_j	115	°C	-
Forward Current	I_F	160	mA	-
Peak Pulsed Forward Current	I_{FP}	320	mA	Duty 1/10, pulse width 10ms
Assembly Process Temperature	-	260 <10	°C s	-
ESD (HBM)	-	2	kV	-

Note:

Proper current derating must be observed to maintain junction temperature below the maximum at all time.

b) Electro-optical Characteristics ($I_F = 150 \text{ mA}$, $T_s = 25 \text{ }^\circ\text{C}$)

Item	Unit	Rank	Bin	Min.	Typ.	Max.
Forward Voltage (VF)	V	GB or GK	G1	5.7	-	6.0
			G2	6.0	-	6.3
			G3	6.3	-	6.6
			G4	6.6	-	6.9
Color Rendering Index (Ra)	-	5		80	-	-
Thermal Resistance (junction to solder point)	$^\circ\text{C/W}$			-	15	-
Beam Angle	$^\circ$			-	120	-

Note:

Samsung maintains measurement tolerance of: forward voltage = $\pm 0.1 \text{ V}$, CRI = ± 3

b) Electro-optical Characteristics (I_F = 150 mA, T_s = 25 °C)

Item	CRI (R _a) Min.	Nominal CCT (K)	Bin	150mA		
				Min.	Max.	
Luminous Flux (Φ _v)	80	2700	SA	S1	98	103
				S2	103	108
			SB	S3	108	113
				S4	113	118
		3000	SA	S1	100	105
				S2	105	110
			SB	S3	110	115
				S4	115	120
		3500	SA	S1	103	108
				S2	108	113
			SB	S3	113	118
				S4	118	123
		4000	SA	S1	105	110
				S2	110	115
			SB	S3	115	120
				S4	120	125
		5000	SA	S1	110	115
				S2	115	120
			SB	S3	120	125
				S4	125	130
5700	SA	S1	108	113		
		S2	113	118		
	SB	S3	118	123		
		S4	123	128		
6500	SA	S1	105	110		
		S2	110	115		
	SB	S3	115	120		
		S4	120	125		

Note:

Samsung maintains measurement tolerance of: forward voltage = ±0.1V, luminous flux = ±5 %, CRI = ±3

2. Product Code Information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	P	M	W	H	1	2	2	1	F	D	5	G	B	R	0	S	B

Digit	PKG Information	Code	Specification														
1 2 3	Samsung Package Middle Power	SPM	Middle power														
4 5	Color	WH	White														
6	Product Version	1	1 st version														
7 8 9	Form Factor	221	2.8 x 3.5 x 0.65 mm; 2 pads; 2chip;														
10	Sorting Current (mA)	F	150 mA														
11	Chromaticity Coordinates	D	ANSI Standard														
12	CRI	5	Min. 80														
13 14	Forward Voltage (V)	GB or GK	<table border="1"> <tr> <td rowspan="4">5.7~6.9</td><td rowspan="4">Bin Code</td><td>G1</td><td>5.7 ~ 6.0</td></tr> <tr> <td>G2</td><td>6.0 ~ 6.3</td></tr> <tr> <td>G3</td><td>6.3 ~ 6.6</td></tr> <tr> <td>G4</td><td>6.6 ~ 6.9</td></tr> </table> <p>GB : 4,000ea per reel ,GK : 12,000ea per reel</p>	5.7~6.9	Bin Code	G1	5.7 ~ 6.0	G2	6.0 ~ 6.3	G3	6.3 ~ 6.6	G4	6.6 ~ 6.9				
5.7~6.9	Bin Code	G1	5.7 ~ 6.0														
		G2	6.0 ~ 6.3														
		G3	6.3 ~ 6.6														
		G4	6.6 ~ 6.9														
15 16	CCT (K)	W☆ V☆ U☆ T☆ R☆ Q☆ P☆	<table border="1"> <tr> <td>2700</td><td>W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG</td></tr> <tr> <td>3000</td><td>V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG</td></tr> <tr> <td>3500</td><td>U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG</td></tr> <tr> <td>4000</td><td>T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG</td></tr> <tr> <td>5000</td><td>R1, R2, R3, R4, R5, R6, R7, R8, R9,RA,RB,RC,RD,RE,RF,RG</td></tr> <tr> <td>5700</td><td>Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9,QA,QB,QC,QD,QE,QF,QG</td></tr> <tr> <td>6500</td><td>P1, P2, P3, P4, P5, P6, P7, P8, P9,PA,PB,PC,PD,PE,PF,PG</td></tr> </table> <p>☆ : "0" (Whole bin) "M" (Quarter bin) or "K" (kitting bin)</p>	2700	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG	3000	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG	3500	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG	4000	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG	5000	R1, R2, R3, R4, R5, R6, R7, R8, R9,RA,RB,RC,RD,RE,RF,RG	5700	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9,QA,QB,QC,QD,QE,QF,QG	6500	P1, P2, P3, P4, P5, P6, P7, P8, P9,PA,PB,PC,PD,PE,PF,PG
2700	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG																
3000	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG																
3500	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG																
4000	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG																
5000	R1, R2, R3, R4, R5, R6, R7, R8, R9,RA,RB,RC,RD,RE,RF,RG																
5700	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9,QA,QB,QC,QD,QE,QF,QG																
6500	P1, P2, P3, P4, P5, P6, P7, P8, P9,PA,PB,PC,PD,PE,PF,PG																
17 18	Luminous Flux	SA SB	<table border="1"> <tr> <td rowspan="2">Bin Code:</td><td>S1, S2</td></tr> <tr> <td>S3, S4</td></tr> </table>	Bin Code:	S1, S2	S3, S4											
Bin Code:	S1, S2																
	S3, S4																

a) Luminous Flux Bins ($I_f = 150 \text{ mA}$, $T_s = 25^\circ\text{C}$)

CRI (R _a) Min.	Nominal CCT (K)	Product Code	Flux Bin	Flux Range (Φ_v , lm)
80	2700	SPMWH1221FD5GBW☆SA	S1	98 ~ 103
			S2	103 ~ 108
		SPMWH1221FD5GBW☆SB	S3	108 ~ 113
			S4	113 ~ 118
	3000	SPMWH1221FD5GBV☆SA	S1	100 ~ 105
			S2	105 ~ 110
		SPMWH1221FD5GBV☆SB	S3	110 ~ 115
			S4	115 ~ 120
	3500	SPMWH1221FD5GBU☆SA	S1	103 ~ 108
			S2	108 ~ 113
		SPMWH1221FD5GBU☆SB	S3	113 ~ 118
			S4	118 ~ 123
	4000	SPMWH1221FD5GBT☆SA	S1	105 ~ 110
			S2	110 ~ 115
		SPMWH1221FD5GBT☆SB	S3	115 ~ 120
			S4	120 ~ 125
	5000	SPMWH1221FD5GBR☆SA	S1	110 ~ 115
			S2	115 ~ 120
		SPMWH1221FD5GBR☆SB	S3	120 ~ 125
			S4	125 ~ 130
	5700	SPMWH1221FD5GBQ☆SA	S1	108 ~ 113
			S2	113 ~ 118
		SPMWH1221FD5GBQ☆SB	S3	118 ~ 123
			S4	123 ~ 128
6500	SPMWH1221FD5GBP☆SA	S1	105 ~ 110	
		S2	110 ~ 115	
	SPMWH1221FD5GBP☆SB	S3	115 ~ 120	
		S4	120 ~ 125	

Note: ☆" can be "0" (Whole bin), "M" (Quarter bin) or "K" (Kitting bin) of the color binning

b) Kitting rule

1) Kitting bin Concept

1. Under agreement between customer and SAMSUNG ELECTRONICS, SAMSUNG can supply kitting bin (VF, Color, Im).
2. A forward voltage (VF) of kitting bin is combined by a pair of same VF rank such as (G1+G1), (G2+G2), (G3+G3) or (G4+G4).
3. A Chromaticity Coordinates of kitting bin is mixed by kitting procedure.(below kitting simulation)

[Kitting example]

D Y	E	F	Z G
9	A	B	C
5	6	7	8
W 1	2	3	X 4

[Binning Information]

	Bin #1	Bin #2
VF	G1	G1
	G2	G2
	G3	G3
	G4	G4
CIE	W (1, 2, 5 bin)	Z (C, F, G bin)
	V (6, 7, A, B bin)	V (6, 7, A, B bin)
	X (3, 4, 8 bin)	Y (9, D, E bin)

※ Each of V, W, X, Y and Z can be one bin without details division

c) Color Bins ($I_F = 150 \text{ mA}$, $T_s = 25 \text{ }^\circ\text{C}$)

CRI (R _a) Min.	Nominal CCT (K)	Product Code	Color Rank	Chromaticity Bins
80	2700	SPMWH1221FD5GBW0S★	W0 (Whole bin)	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG
		SPMWH1221FD5GBWMS★	WM (Quarter bin)	W6, W7, WA, WB
		SPMWH1221FD5GBWKS★	WK (Kitting bin)	WV, WW, WX, WY, WZ
	3000	SPMWH1221FD5GBV0S★	V0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
		SPMWH1221FD5GBVMS★	VM (Quarter bin)	V6, V7, VA, VB
		SPMWH1221FD5GBVKS★	VK (Kitting bin)	VV, VW, VX, VY, VZ
	3500	SPMWH1221FD5GBU0S★	U0 (Whole bin)	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
		SPMWH1221FD5GBUMS★	UM (Quarter bin)	U6, U7, UA, UB
		SPMWH1221FD5GBUKS★	UK (Kitting bin)	UV, UW, UX, UY, UZ
	4000	SPMWH1221FD5GBT0S★	T0 (Whole bin)	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
		SPMWH1221FD5GBTMS★	TM (Quarter bin)	T6, T7, TA, TB
		SPMWH1221FD5GBTKS★	TK (Kitting bin)	TV, TW, TX, TY, TZ
	5000	SPMWH1221FD5GBR0S★	R0 (Whole bin)	R1, R2, R3, R4, R5, R6, R7, R8, R9, RA, RB, RC, RD, RE, RF, RG
		SPMWH1221FD5GBRMS★	RM (Quarter bin)	R6, R7, RA, RB
		SPMWH1221FD5GBRKS★	RK (Kitting bin)	RV, RW, RX, RY, RZ
	5700	SPMWH1221FD5GBQ0S★	Q0 (Whole bin)	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, QA, QB, QC, QD, QE, QF, QG
		SPMWH1221FD5GBQMS★	QM (Quarter bin)	Q6, Q7, QA, QB
		SPMWH1221FD5GBQKS★	QK (Kitting bin)	QV, QW, QX, QY, QZ
	6500	SPMWH1221FD5GBP0S★	P0 (Whole bin)	P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, PB, PC, PD, PE, PF, PG
		SPMWH1221FD5GBPMS★	PM (Quarter bin)	P6, P7, PA, PB
		SPMWH1221FD5GBPKS★	PK (Kitting bin)	PV, PW, PX, PY, PZ

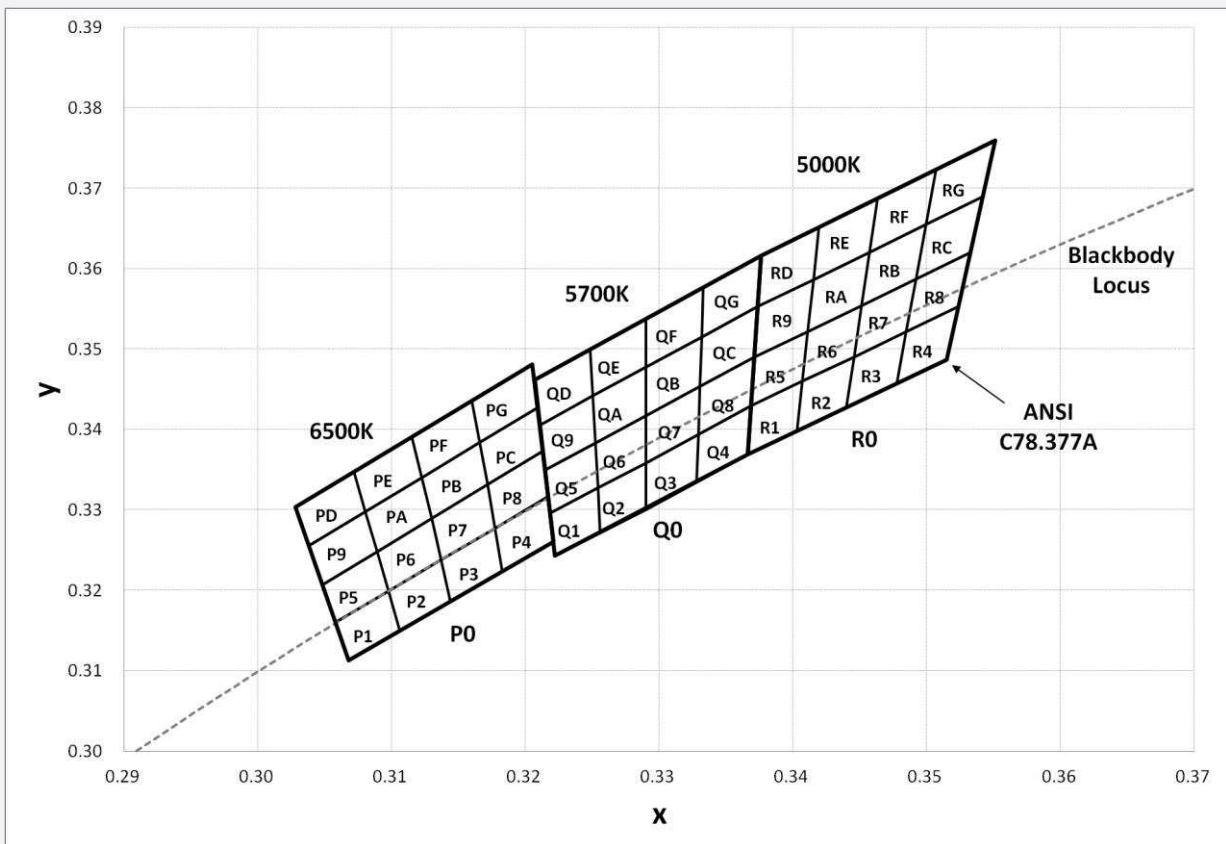
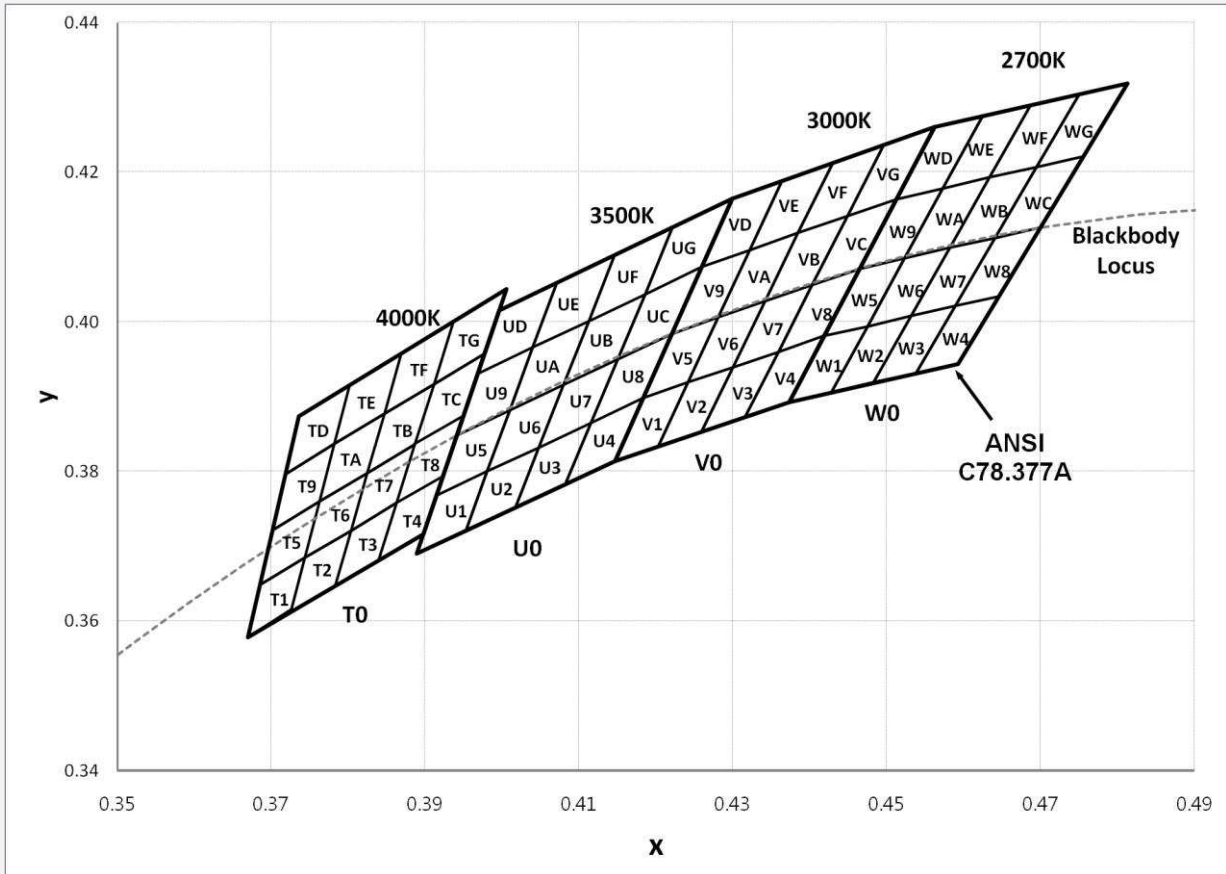
Note:

★ can be "SA" or "SB" of luminous flux bin

d) Voltage Bins ($I_f = 150 \text{ mA}$, $T_s = 25 \text{ }^\circ\text{C}$)

CRI (R_a) Min.	Nominal CCT (K)	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
-	-	-		G1	5.7 ~ 6.0
			GB	G2	6.0 ~ 6.3
			or		
			GK	G3	6.3 ~ 6.6
				G4	6.6 ~ 6.9

e) Chromaticity Region & Coordinates ($I_F = 150 \text{ mA}$, $T_s = 25 \text{ }^\circ\text{C}$)



e) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
W rank (2700 K)					
W1	0.4373	0.3893	W9	0.4465	0.4071
	0.4418	0.3981		0.4513	0.4164
	0.4475	0.3994		0.4573	0.4178
	0.4428	0.3906		0.4523	0.4085
W2	0.4428	0.3906	WA	0.4523	0.4085
	0.4475	0.3994		0.4573	0.4178
	0.4532	0.4008		0.4634	0.4193
	0.4483	0.3919		0.4582	0.4099
W3	0.4483	0.3919	WB	0.4582	0.4099
	0.4532	0.4008		0.4634	0.4193
	0.4589	0.4021		0.4695	0.4207
	0.4538	0.3931		0.4641	0.4112
W4	0.4538	0.3931	WC	0.4641	0.4112
	0.4589	0.4021		0.4695	0.4207
	0.4646	0.4034		0.4756	0.4221
	0.4593	0.3944		0.4700	0.4126
W5	0.4418	0.3981	WD	0.4513	0.4164
	0.4465	0.4071		0.4562	0.4260
	0.4523	0.4085		0.4624	0.4274
	0.4475	0.3994		0.4573	0.4178
W6	0.4475	0.3994	WE	0.4573	0.4178
	0.4523	0.4085		0.4624	0.4274
	0.4582	0.4099		0.4687	0.4289
	0.4532	0.4008		0.4634	0.4193
W7	0.4532	0.4008	WF	0.4634	0.4193
	0.4582	0.4099		0.4687	0.4289
	0.4641	0.4112		0.4750	0.4304
	0.4589	0.4021		0.4695	0.4207
W8	0.4589	0.4021	WG	0.4695	0.4207
	0.4641	0.4112		0.4750	0.4304
	0.4700	0.4126		0.4813	0.4319
	0.4646	0.4034		0.4756	0.4221

Region	CIE x	CIE y	Region	CIE x	CIE y
V rank (3000 K)					
V1	0.4147	0.3814	V9	0.4221	0.3984
	0.4183	0.3898		0.4259	0.4073
	0.4242	0.3919		0.4322	0.4096
	0.4203	0.3833		0.4281	0.4006
V2	0.4203	0.3833	VA	0.4281	0.4006
	0.4242	0.3919		0.4322	0.4096
	0.4300	0.3939		0.4385	0.4119
	0.4259	0.3853		0.4342	0.4028
V3	0.4259	0.3853	VB	0.4342	0.4028
	0.4300	0.3939		0.4385	0.4119
	0.4359	0.3960		0.4449	0.4141
	0.4316	0.3873		0.4403	0.4049
V4	0.4316	0.3873	VC	0.4403	0.4049
	0.4359	0.3960		0.4449	0.4141
	0.4418	0.3981		0.4513	0.4164
	0.4373	0.3893		0.4465	0.4071
V5	0.4183	0.3898	VD	0.4259	0.4073
	0.4221	0.3984		0.4299	0.4165
	0.4281	0.4006		0.4364	0.4188
	0.4242	0.3919		0.4322	0.4096
V6	0.4242	0.3919	VE	0.4322	0.4096
	0.4281	0.4006		0.4364	0.4188
	0.4342	0.4028		0.4430	0.4212
	0.4300	0.3939		0.4385	0.4119
V7	0.4300	0.3939	VF	0.4385	0.4119
	0.4342	0.4028		0.4430	0.4212
	0.4403	0.4049		0.4496	0.4236
	0.4359	0.3960		0.4449	0.4141
V8	0.4359	0.3960	VG	0.4449	0.4141
	0.4403	0.4049		0.4496	0.4236
	0.4465	0.4071		0.4562	0.4260
	0.4418	0.3981		0.4513	0.4164

e) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
U rank (3500 K)					
U1	0.3889	0.3690	U9	0.3941	0.3848
	0.3915	0.3768		0.3968	0.3930
	0.3981	0.3800		0.4040	0.3966
	0.3953	0.3720		0.4010	0.3882
U2	0.3953	0.3720	UA	0.4010	0.3882
	0.3981	0.3800		0.4040	0.3966
	0.4048	0.3832		0.4113	0.4001
	0.4017	0.3751		0.4080	0.3916
U3	0.4017	0.3751	UB	0.4080	0.3916
	0.4048	0.3832		0.4113	0.4001
	0.4116	0.3865		0.4186	0.4037
	0.4082	0.3782		0.4150	0.3950
U4	0.4082	0.3782	UC	0.4150	0.3950
	0.4116	0.3865		0.4186	0.4037
	0.4183	0.3898		0.4259	0.4073
	0.4147	0.3814		0.4221	0.3984
U5	0.3915	0.3768	UD	0.3968	0.3930
	0.3941	0.3848		0.3996	0.4015
	0.4010	0.3882		0.4071	0.4052
	0.3981	0.3800		0.4040	0.3966
U6	0.3981	0.3800	UE	0.4040	0.3966
	0.4010	0.3882		0.4071	0.4052
	0.4080	0.3916		0.4146	0.4089
	0.4048	0.3832		0.4113	0.4001
U7	0.4048	0.3832	UF	0.4113	0.4001
	0.4080	0.3916		0.4146	0.4089
	0.4150	0.3950		0.4222	0.4127
	0.4116	0.3865		0.4186	0.4037
U8	0.4116	0.3865	UG	0.4186	0.4037
	0.4150	0.3950		0.4222	0.4127
	0.4221	0.3984		0.4299	0.4165
	0.4183	0.3898		0.4259	0.4073

Region	CIE x	CIE y	Region	CIE x	CIE y
T rank (4000 K)					
T1	0.3670	0.3578	T9	0.3702	0.3722
	0.3726	0.3612		0.3763	0.3760
	0.3744	0.3685		0.3782	0.3837
	0.3686	0.3649		0.3719	0.3797
T2	0.3726	0.3612	TA	0.3763	0.3760
	0.3783	0.3646		0.3825	0.3798
	0.3804	0.3721		0.3847	0.3877
	0.3744	0.3685		0.3782	0.3837
T3	0.3783	0.3646	TB	0.3825	0.3798
	0.3840	0.3681		0.3887	0.3836
	0.3863	0.3758		0.3912	0.3917
	0.3804	0.3721		0.3847	0.3877
T4	0.3840	0.3681	TC	0.3887	0.3837
	0.3898	0.3716		0.3950	0.3875
	0.3924	0.3794		0.3978	0.3958
	0.3863	0.3758		0.3912	0.3917
T5	0.3686	0.3649	TD	0.3719	0.3797
	0.3744	0.3685		0.3782	0.3837
	0.3763	0.3760		0.3802	0.3916
	0.3702	0.3722		0.3736	0.3874
T6	0.3744	0.3685	TE	0.3782	0.3837
	0.3804	0.3721		0.3847	0.3877
	0.3825	0.3798		0.3869	0.3958
	0.3763	0.376		0.3802	0.3916
T7	0.3804	0.3721	TF	0.3847	0.3877
	0.3863	0.3758		0.3912	0.3917
	0.3887	0.3836		0.3937	0.4001
	0.3825	0.3798		0.3869	0.3958
T8	0.3863	0.3758	TG	0.3912	0.3917
	0.3924	0.3794		0.3978	0.3958
	0.3950	0.3875		0.4006	0.4044
	0.3887	0.3836		0.3937	0.4001

e) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
R rank (5000 K)					
R1	0.3366	0.3369	R9	0.3374	0.3554
	0.3369	0.3431		0.3371	0.3493
	0.3407	0.3460		0.3411	0.3522
	0.3403	0.3398		0.3415	0.3587
R2	0.3403	0.3398	RA	0.3415	0.3587
	0.3407	0.3460		0.3411	0.3522
	0.3446	0.3491		0.3451	0.3554
	0.3440	0.3427		0.3457	0.3621
R3	0.3446	0.3491	RB	0.3451	0.3554
	0.3440	0.3427		0.3457	0.3621
	0.3477	0.3458		0.3500	0.3655
	0.3485	0.3522		0.3492	0.3587
R4	0.3485	0.3522	RC	0.3492	0.3587
	0.3477	0.3458		0.3500	0.3655
	0.3514	0.3487		0.3542	0.3690
	0.3524	0.3554		0.3533	0.3620
R5	0.3371	0.3493	RD	0.3376	0.3616
	0.3369	0.3431		0.3374	0.3554
	0.3407	0.3460		0.3415	0.3587
	0.3411	0.3522		0.3420	0.3652
R6	0.3407	0.3460	RE	0.3415	0.3587
	0.3411	0.3522		0.3420	0.3652
	0.3451	0.3554		0.3463	0.3687
	0.3446	0.3491		0.3457	0.3621
R7	0.3446	0.3491	RF	0.3457	0.3621
	0.3451	0.3554		0.3463	0.3687
	0.3492	0.3587		0.3507	0.3724
	0.3485	0.3522		0.3500	0.3655
R8	0.3485	0.3522	RG	0.3500	0.3655
	0.3492	0.3587		0.3507	0.3724
	0.3533	0.3620		0.3551	0.3760
	0.3524	0.3554		0.3542	0.3690

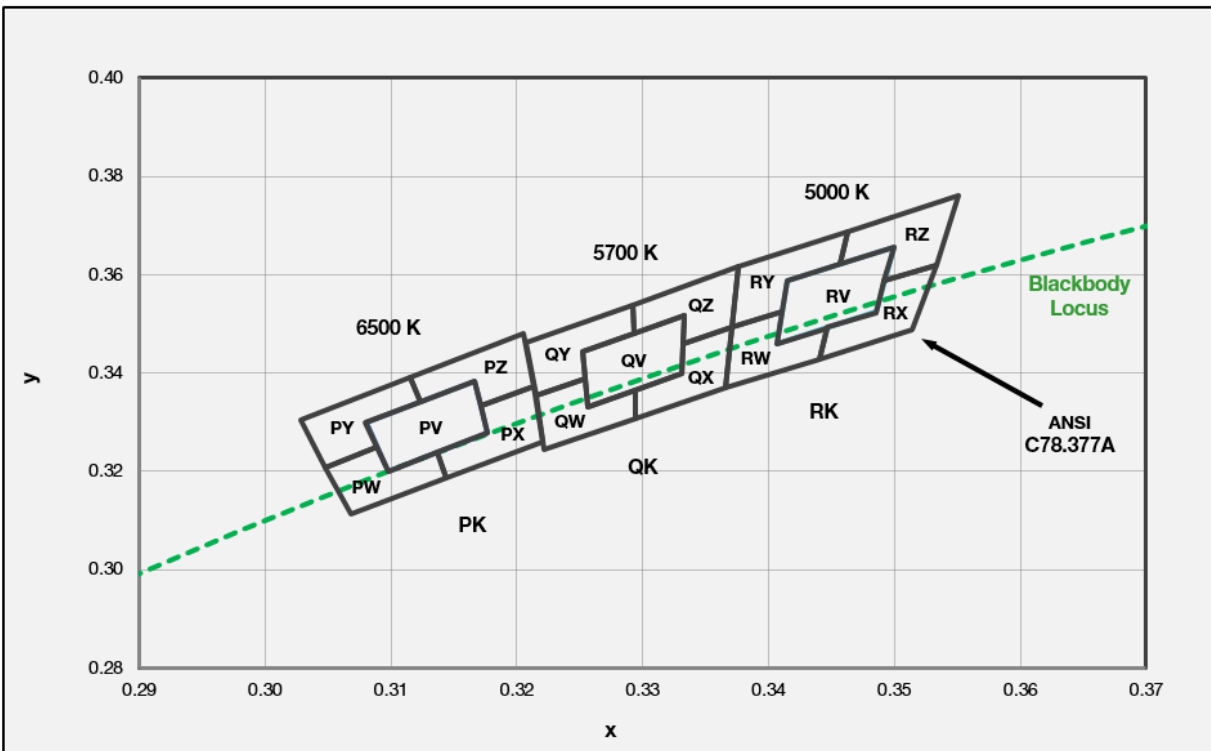
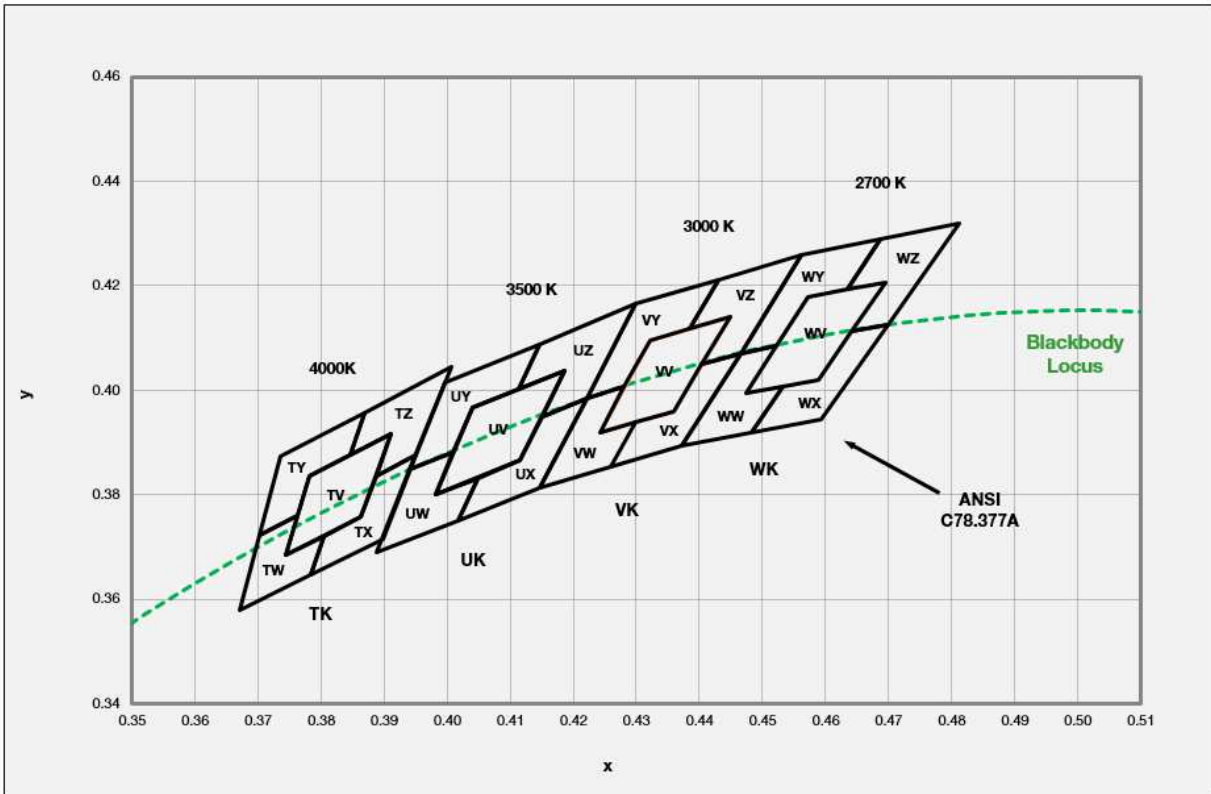
Region	CIE x	CIE y	Region	CIE x	CIE y
Q rank (5700 K)					
Q1	0.3218	0.3298	Q9	0.3211	0.3407
	0.3222	0.3243		0.3215	0.3353
	0.3258	0.3275		0.3254	0.3388
	0.3256	0.3331		0.3252	0.3444
Q2	0.3256	0.3331	QA	0.3252	0.3444
	0.3258	0.3275		0.3254	0.3388
	0.3294	0.3306		0.3293	0.3423
	0.3294	0.3364		0.3293	0.3481
Q3	0.3294	0.3364	QB	0.3293	0.3481
	0.3294	0.3306		0.3293	0.3423
	0.3330	0.3338		0.3332	0.3458
	0.3331	0.3398		0.3333	0.3518
Q4	0.3331	0.3398	QC	0.3333	0.3518
	0.3330	0.3338		0.3332	0.3458
	0.3366	0.3369		0.3371	0.3493
	0.3369	0.3431		0.3374	0.3554
Q5	0.3215	0.3353	QD	0.3207	0.3462
	0.3218	0.3298		0.3211	0.3407
	0.3256	0.3331		0.3252	0.3444
	0.3254	0.3388		0.3250	0.3501
Q6	0.3254	0.3388	QE	0.3250	0.3501
	0.3256	0.3331		0.3252	0.3444
	0.3294	0.3364		0.3293	0.3481
	0.3293	0.3423		0.3292	0.3539
Q7	0.3293	0.3423	QF	0.3292	0.3539
	0.3294	0.3364		0.3293	0.3481
	0.3331	0.3398		0.3333	0.3518
	0.3332	0.3458		0.3334	0.3578
Q8	0.3332	0.3458	QG	0.3334	0.3578
	0.3331	0.3398		0.3333	0.3518
	0.3369	0.3431		0.3374	0.3554
	0.3371	0.3493		0.3376	0.3616

e) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
P rank (6500 K)					
P1	0.3068	0.3113	P9	0.3048	0.3207
	0.3106	0.3150		0.3089	0.3249
	0.3098	0.3199		0.3080	0.3298
	0.3058	0.3160		0.3038	0.3256
P2	0.3106	0.3150	PA	0.3089	0.3249
	0.3144	0.3186		0.313	0.3290
	0.3137	0.3238		0.3123	0.3341
	0.3098	0.3199		0.3080	0.3298
P3	0.3144	0.3186	PB	0.3130	0.3290
	0.3183	0.3224		0.3172	0.3332
	0.3177	0.3278		0.3166	0.3384
	0.3137	0.3238		0.3123	0.3341
P4	0.3183	0.3224	PC	0.3172	0.3332
	0.3221	0.3261		0.3214	0.3373
	0.3218	0.3317		0.3210	0.3427
	0.3177	0.3278		0.3166	0.3384
P5	0.3058	0.3160	PD	0.3038	0.3256
	0.3098	0.3199		0.3080	0.3298
	0.3089	0.3249		0.3072	0.3348
	0.3048	0.3207		0.3028	0.3304
P6	0.3098	0.3199	PE	0.3080	0.3298
	0.3137	0.3238		0.3123	0.3341
	0.3130	0.3290		0.3115	0.3391
	0.3089	0.3249		0.3072	0.3348
P7	0.3137	0.3238	PF	0.3123	0.3341
	0.3177	0.3278		0.3166	0.3384
	0.3172	0.3332		0.3160	0.3436
	0.313	0.3290		0.3115	0.3391
P8	0.3177	0.3278	PG	0.3166	0.3384
	0.3218	0.3317		0.3210	0.3427
	0.3214	0.3373		0.3206	0.3481
	0.3172	0.3332		0.3160	0.3436

Note: Samsung maintains measurement tolerance of: Cx, Cy = ±0.005

f) Kitting Chromaticity Region & Coordinates ($I_F = 150 \text{ mA}$, $T_s = 25^\circ\text{C}$)



f) Kitting Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
W rank (2700 K)					
WV	0.4475	0.3994			
	0.4589	0.4021			
	0.4695	0.4207			
	0.4573	0.4178			
WW	0.4373	0.3893	WY	0.4465	0.4071
	0.4483	0.3919		0.4523	0.4085
	0.4532	0.4008		0.4573	0.4178
	0.4475	0.3994		0.4634	0.4193
	0.4523	0.4085		0.4687	0.4289
	0.4465	0.4071		0.4562	0.4260
WX	0.4483	0.3919	WZ	0.4641	0.4112
	0.4593	0.3944		0.4700	0.4126
	0.4700	0.4126		0.4813	0.4319
	0.4641	0.4112		0.4687	0.4289
	0.4589	0.4021		0.4634	0.4193
	0.4532	0.4008		0.4695	0.4207

Region	CIE x	CIE y	Region	CIE x	CIE y
V rank (3000 K)					
VW	0.4242	0.3919			
	0.4359	0.3960			
	0.4449	0.4141			
	0.4322	0.4096			
VW	0.4147	0.3814	VY	0.4221	0.3984
	0.4259	0.3853		0.4281	0.4006
	0.4300	0.3939		0.4322	0.4096
	0.4242	0.3919		0.4385	0.4119
	0.4281	0.4006		0.4430	0.4212
	0.4221	0.3984		0.4299	0.4165
VX	0.4259	0.3853	VZ	0.4403	0.4049
	0.4373	0.3893		0.4465	0.4071
	0.4465	0.4071		0.4562	0.4260
	0.4403	0.4049		0.4430	0.4212
	0.4359	0.3960		0.4385	0.4119
	0.4300	0.3939		0.4449	0.4141

Region	CIE x	CIE y	Region	CIE x	CIE y
U rank (3500 K)					
UV	0.3981	0.3800			
	0.4116	0.3865			
	0.4186	0.4037			
	0.4040	0.3966			
UW	0.3889	0.3690	UY	0.3941	0.3848
	0.4017	0.3751		0.4010	0.3882
	0.4048	0.3832		0.4040	0.3966
	0.3981	0.3800		0.4113	0.4001
	0.4010	0.3882		0.4146	0.4089
	0.3941	0.3848		0.3996	0.4015
UX	0.4017	0.3751	UZ	0.4150	0.3950
	0.4147	0.3814		0.4221	0.3984
	0.4221	0.3984		0.4299	0.4165
	0.4150	0.3950		0.4146	0.4089
	0.4116	0.3865		0.4113	0.4001
	0.4048	0.3832		0.4186	0.4037

Region	CIE x	CIE y	Region	CIE x	CIE y
T rank (4000 K)					
TV	0.3744	0.3685			
	0.3863	0.3758			
	0.3912	0.3917			
	0.3782	0.3837			
TW	0.3670	0.3578	TY	0.3702	0.3722
	0.3783	0.3646		0.3763	0.3760
	0.3804	0.3721		0.3782	0.3837
	0.3744	0.3685		0.3847	0.3877
	0.3763	0.3760		0.3869	0.3958
	0.3702	0.3722		0.3736	0.3874
TX	0.3783	0.3646	TZ	0.3887	0.3837
	0.3898	0.3716		0.3950	0.3875
	0.3950	0.3875		0.4006	0.4044
	0.3887	0.3837		0.3869	0.3958
	0.3863	0.3758		0.3847	0.3877
	0.3804	0.3721		0.3912	0.3917



f) Kitting Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
R rank (5000 K)					
RV	0.3407	0.3460			
	0.3485	0.3524			
	0.3500	0.3655			
	0.3415	0.3588			
RW	0.3366	0.3369	RY	0.3371	0.3493
	0.3440	0.3427		0.3411	0.3525
	0.3446	0.3491		0.3415	0.3588
	0.3407	0.3460		0.3457	0.3621
	0.3411	0.3525		0.3463	0.3687
	0.3371	0.3493		0.3376	0.3616
RX	0.3440	0.3428	RZ	0.3457	0.3621
	0.3514	0.3487		0.3500	0.3655
	0.3533	0.3620		0.3492	0.3587
	0.3492	0.3587		0.3533	0.3620
	0.3485	0.3522		0.3551	0.3760
	0.3446	0.3493		0.3463	0.3687

Region	CIE x	CIE y	Region	CIE x	CIE y
Q rank (5700 K)					
QV	0.3256	0.3331			
	0.3331	0.3398			
	0.3333	0.3518			
	0.3252	0.3444			
QW	0.3222	0.3243	QY	0.3215	0.3353
	0.3294	0.3306		0.3254	0.3388
	0.3294	0.3364		0.3252	0.3444
	0.3256	0.3331		0.3293	0.3481
	0.3254	0.3388		0.3292	0.3539
	0.3215	0.3353		0.3207	0.3462
QX	0.3294	0.3306	QZ	0.3293	0.3481
	0.3366	0.3369		0.3333	0.3518
	0.3371	0.3493		0.3332	0.3458
	0.3332	0.3458		0.3371	0.3493
	0.3331	0.3398		0.3376	0.3616
	0.3294	0.3364		0.3292	0.3539

Region	CIE x	CIE y	Region	CIE x	CIE y
P rank (6500 K)					
PV	0.3098	0.3199			
	0.3177	0.3278			
	0.3166	0.3384			
	0.3080	0.3298			
PW	0.3068	0.3113	PY	0.3048	0.3207
	0.3144	0.3186		0.3089	0.3249
	0.3137	0.3238		0.308	0.3298
	0.3098	0.3199		0.3123	0.3341
	0.3089	0.3249		0.3115	0.3391
	0.3048	0.3207		0.3028	0.3304
PX	0.3144	0.3186	PZ	0.3123	0.3341
	0.3221	0.3261		0.3166	0.3384
	0.3213	0.3373		0.3172	0.3332
	0.3172	0.3332		0.3213	0.3373
	0.3177	0.3278		0.3205	0.3481
	0.3137	0.3238		0.3115	0.3391

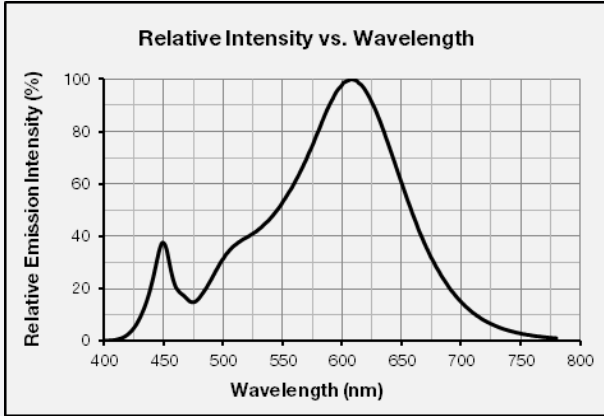
Note:

Samsung maintains measurement tolerance of: Cx, Cy = ±0.005

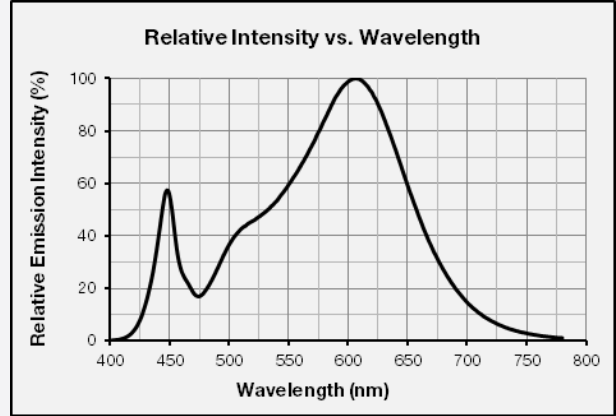
3. Typical Characteristics Graphs

a) Spectrum Distribution ($I_f = 150 \text{ mA}$, $T_s = 25 \text{ }^\circ\text{C}$)

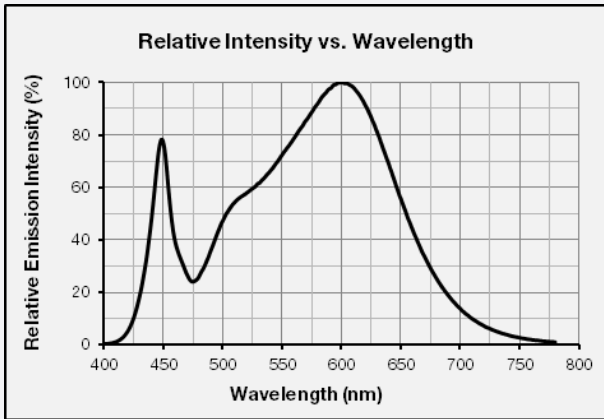
CCT: 2700 K (80 CRI)



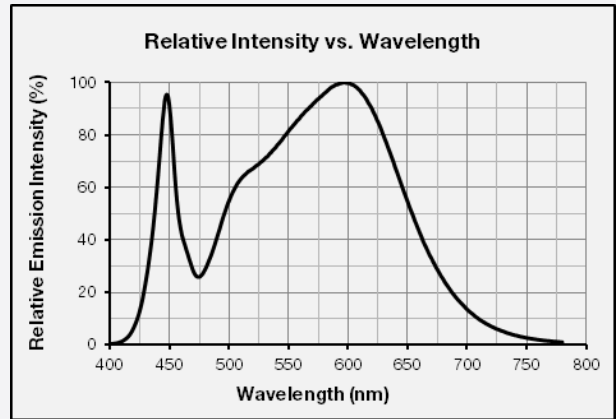
CCT: 3000 K (80 CRI)



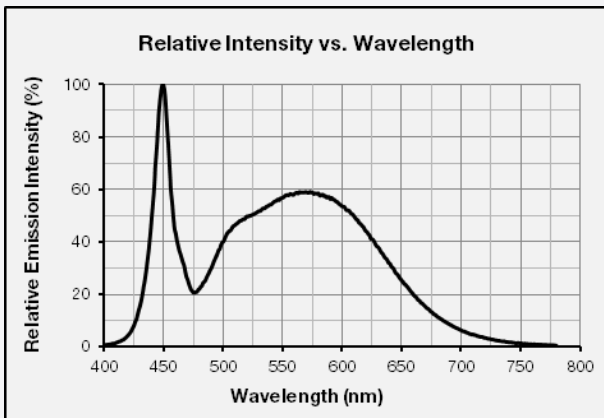
CCT: 3500 K (80 CRI)



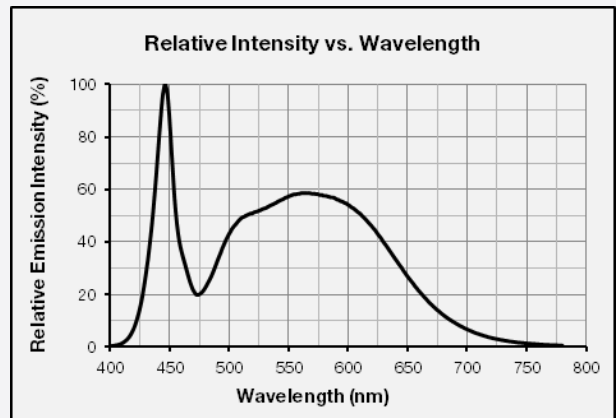
CCT: 4000 K (80 CRI)



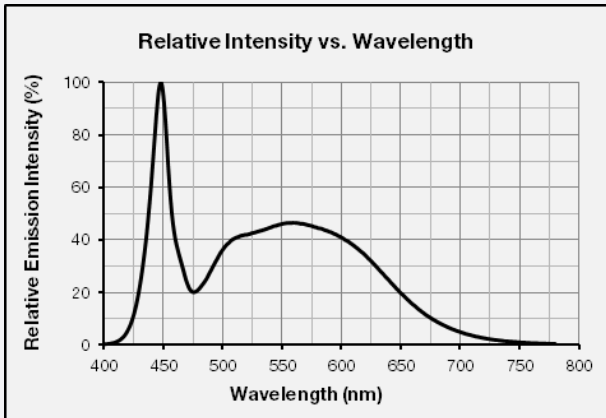
CCT: 5000 K (80 CRI)



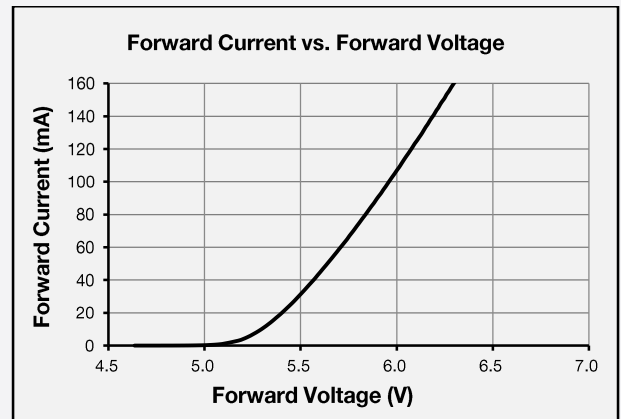
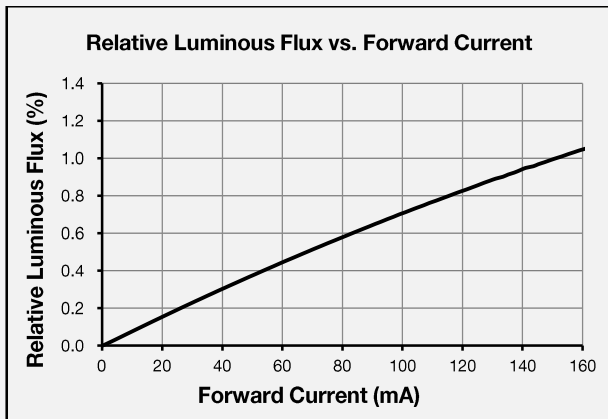
CCT: 5700 K (80 CRI)



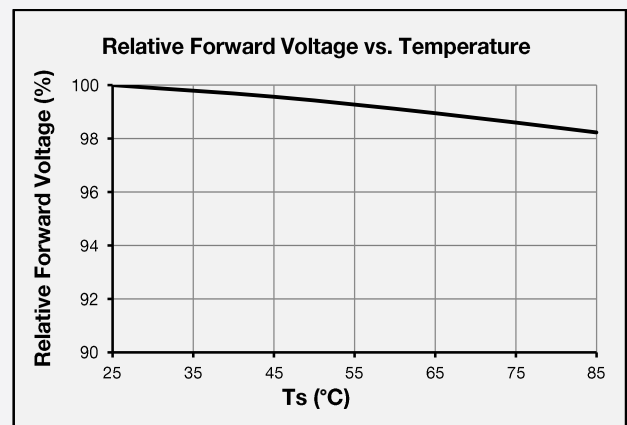
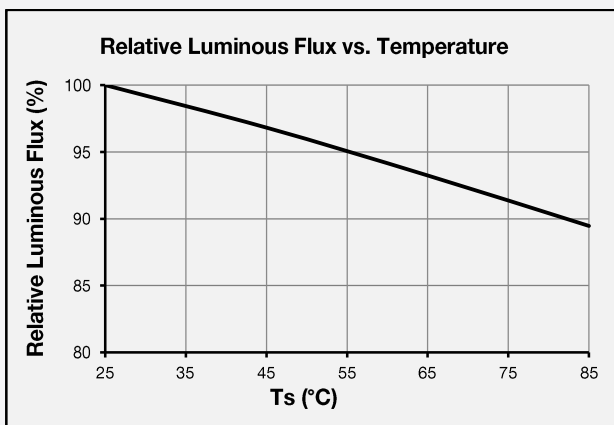
CCT: 6500 K (80 CRI)



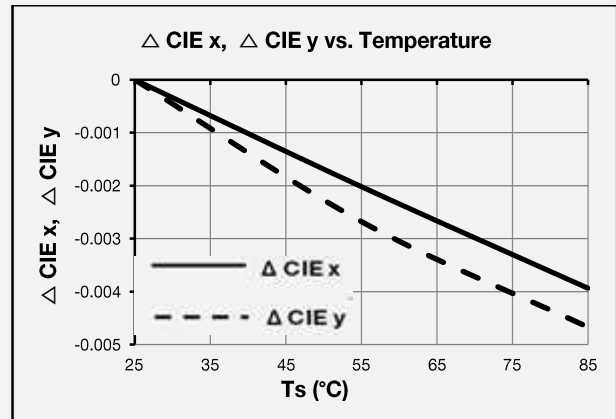
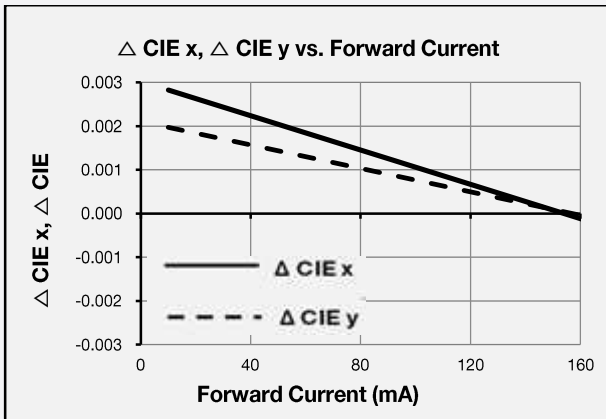
b) Forward Current Characteristics (Ts = 25 °C)



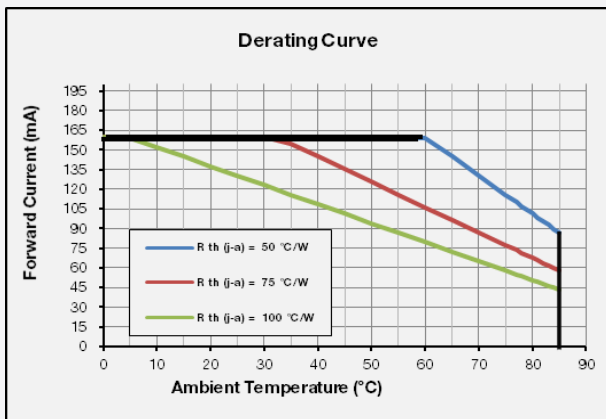
c) Temperature Characteristics (If = 150 mA)



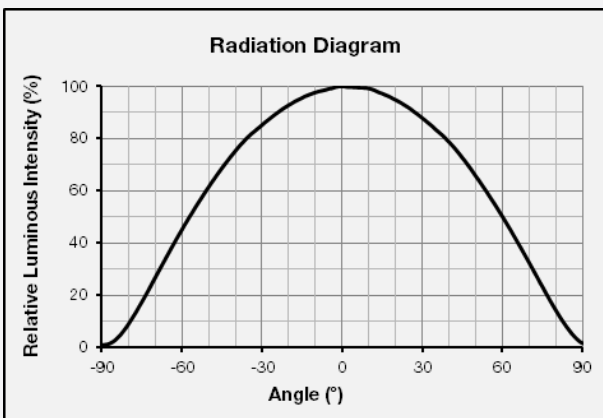
d) Color Shift Characteristics ($I_f = 150 \text{ mA}$, $T_s = 25 \text{ }^\circ\text{C}$)



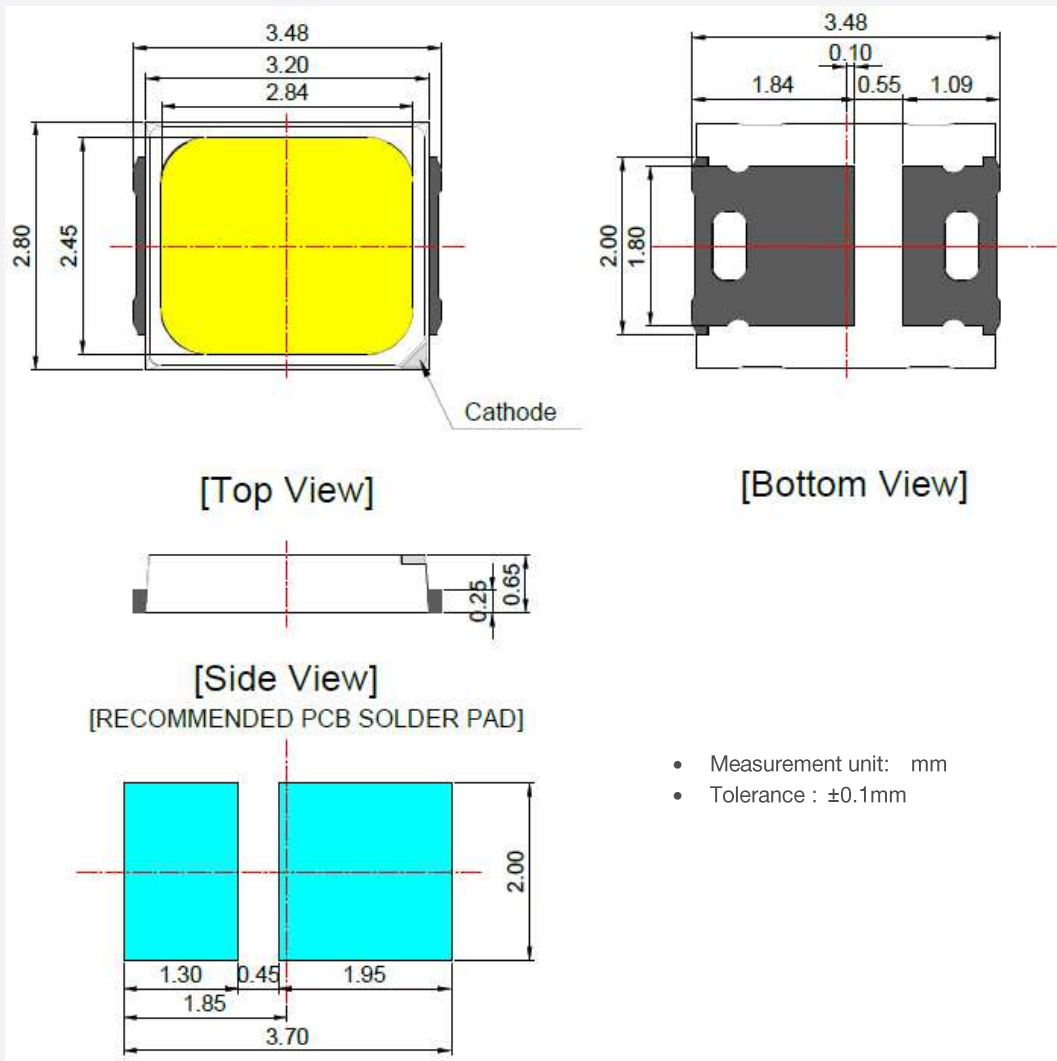
e) Derating Curve



f) Beam Angle Characteristics ($I_f = 150 \text{ mA}$, $T_s = 25 \text{ }^\circ\text{C}$)



4. Outline Drawing & Dimension



Notes:

- 1) T_s point and measurement method:
 - ① Measure one point at the cathode pad, if necessary remove PSR of PCB to reach T_s point.
 - ② All pads must be soldered to the PCB to dissipate heat properly, otherwise the LED can be damaged.

Precautions:

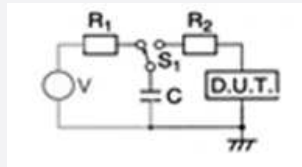
- 1) Pressure on the LEDs will influence to the reliability of the LEDs. Precautions should be taken to avoid strong pressure on the LEDs. Do not put stress on the LEDs during heating.
- 2) Re-soldering should not be done after the LEDs have been soldered. If re-soldering is unavoidable, LED's characteristics should be carefully checked before and after such repair.
- 3) Do not stack assembled PCBs together. Since materials of LEDs is soft, abrasion between two PCB assembled with LED might cause catastrophic failure of the LEDs.

5. Reliability Test Items & Conditions

a) Test Items

Test Item	Test Condition	Test Hour / Cycle	Sample No.
Room Temperature Life Test	25 °C, DC 160 mA	1000 h	22
High Temperature Life Test	85 °C, DC 160 mA	1000 h	22
High Temperature Humidity Life Test	85 °C, 85 % RH, DC 160 mA	1000 h	22
Low Temperature Life Test	-40 °C, DC 160 mA	1000 h	22
Powered Temperature Cycle Test	-45 °C ~ 85 °C, each 20 min, on/off 5 min Temp. Change time 100min, DC 160 mA	100 cycles	22
Temperature Cycling	-45 °C / 15 min ↔ 125 °C / 15 min	200 cycles	100
High Temperature Storage	120 °C	1000 h	11
Low Temperature Storage	-40 °C	1000 h	11

ESD (HBM)



R_1 : 10 M Ω
 R_2 : 1.5 k Ω
 C : 100 pF
 V : ± 2 kV

5 times

30

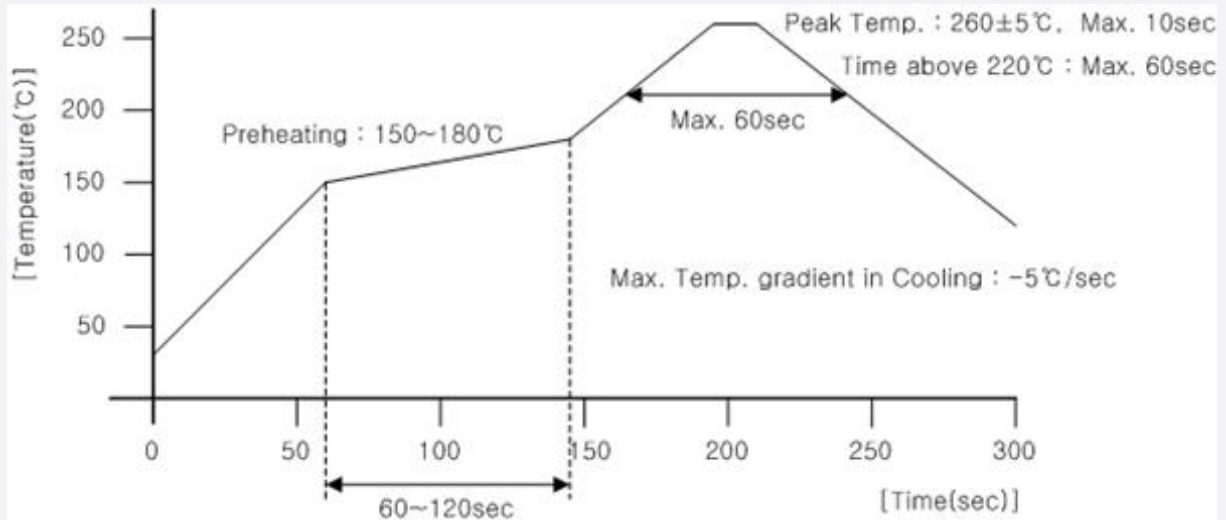
b) Criteria for Judging the Damage

Item	Symbol	Test Condition ($T_s = 25$ °C)	Limit	
			Min	Max
Forward Voltage	V_F	$I_F = 150$ mA	Init. Value * 0.9	Init. Value * 1.1
Luminous Flux	Φ_v	$I_F = 150$ mA	Init. Value * 0.7	Init. Value * 1.1

6. Soldering Conditions

a) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.



b) Manual Soldering Conditions

Not more than 5 seconds @ max. 300 °C, under soldering iron.

7. Tape & Reel

a) Taping Dimension

